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OFFICIAL NEWSLETTER OF THE INTEGRATED PEST MANAGEMENT RESEARCH, DEVELOPMENT AND APPLICATIONS PROGRAM
2500 SHREVEPORT HIGHWAY · PINEVILLE, LOUISIANA 71360

IPM Program Lists 1984 Projects

The Integrated Pest Management Program has announced its program-funded projects for 1984. This year's 26 projects involve some 58 principal investigators at University, State, and USDA Forest Service organizations in 11 southern and southeastern States plus New Mexico, according to Program Manager Bob Thatcher.

A chart appears on pages 2, 3 and 4 of this issue of PM News listing project titles, principal investigators, performing organizations, and State locations.

1984 Insect Work Conference Scheduled

The 1984 Southern Forest Insect Work Conference will be held in Charleston, South Carolina, August 7 – 9 at the Charleston Sheraton Hotel. The Sheraton is a new hotel, located on the Ashley River, close to the historic downtown area with its many beautifully preserved Eighteenth and Nineteenth Century homes and buildings.

Mike Remion and Andy Boone (SC Commission of Forestry) are in charge of local arrangements; Gary DeBarr (Southeastern Forest Experiment Station) is Program Chairman. They will provide additional information; or interested persons can contact Garland Mason, SFIWC Secretary-Treasurer, USDA Forest Service, 2500 Shreveport Highway, Pineville, LA 71360, telephone 318/473-7250.

Texas Advisory Group Meets

The Landowner Advisory Board for the Texas Forest Service (TFS) Demonstration Project met at the Cudlipp Forestry Center in Lufkin, Texas, on February 29. Activities and accomplishments of Phase IV (1983) were discussed by Ron Billings. Demonstrations of the Texas A&M SPB Decision Support System were given by R. N. Coulson and M. C. Saunders and of a growth and yield model for unthinned slash pine plantations infected with fusiform rust by Eugene Shoulders, Southern Station. Tom Payne of Texas A&M presented field test results from his project on SPB spot growth disruption with frontalure.

Last year, Billings' project set up microcomputer facilities at the Livingston TFS district office, implemented and validated the TFS grid-block hazard rating system for SPB, validated stand hazard classes for the Polk and Tyler County demonstration area, monitored 22 spots for spot growth model validation, evaluated the use of pheromone, and conducted various technology transfer activities.

In discussing the Decision Support System, Dr. Coulson emphasized the need for user feedback and revealed that the long term goal was to have this unique system ultimately store all technology related to the management of the SPB problem in the South. The fusiform rust growth and yield model is available for use through Southern Forest Experiment Station computers at Pineville and New Orleans, La., and Gulfport, Miss. Dr. Shoulders also stressed the need for receiving feedback and individual tree record data from users that could be used in refining the system and making it more effective.

After the demonstrations, Dr. Billings discussed Phase V objectives for 1984 which include: 1) Evaluation of the SPB decision support system, 2) implementation of the grid block hazard-rating system in east Texas, 3) further validation of spot growth models, and 4) development of a microcomputer decision key for direct control. The meeting concluded with a slide presentation on helicopter logging of beetle-killed trees from the Four Notch proposed wilderness area.

Attendees included Federal, State, university, and industry personnel. Gerry Hertel and Susan Branham attended from the IPM Program.

Continuing IPM Program-Funded Projects for FY 1984[1]

Location	Performing Organization	Principal Investigator(s)	Title of Project
Alabama	Ala. For. Comm.	J. R. Hyland R. C. Kucera	***Integrated management of southern pine beetle and annosus root rot in Alabama.
	SE For. Exp. Sta. Univ. of Florida Union Camp Corp.	R. P. Belanger T. Miller R. S. Webb J. F. Godbee	Forest management strategies for reducing beetle- and pathogen-caused losses in planted stands: The salvage cutting of trees infected with fusiform rust. (Project headquartered in Athens, GA)
	Virginia Polytech. Instit. & State Univ.	S. A. Alexander	***An annosum root rot prediction model for rating the susceptibility of loblolly pine to infestation by the southern pine beetle. (Project headquartered in Blacksburg, VA)
	Region 8, S&PF	W. N. Nettleton M. D. Connor	Application of southern pine beetle spot growth models in the Gulf Coastal Plain. (Project headquartered in Pineville, LA)
Arkansas	Univ. of Arkansas—Fayetteville	F. M. Stephen T. D. Paine	Evaluation of host tree resistance and its effect on southern pine beetle population dynamics.
	Univ. of New Mexico Univ. of Arkansas—Fayetteville	R. G. Cates F. M. Stephen	Induced chemistry of loblolly pine with regard to phenology, host resistance and suitability to the SPB-fungal complex. (Project headquartered in Albuquerque, NM)
Florida	Univ. of Florida	J. L. Foltz R. C. Wilkinson	***Sampling and dynamics of bark-infesting beetles in slash pine plantations.
	SE For. Exp. Sta. Univ. of Florida Union Camp Corp.	R. P. Belanger T. Miller R. S. Webb J. F. Godbee	Forest management strategies for reducing beetle- and pathogen-caused losses in planted stands: The salvage cutting of trees infected with fusiform rust. (Project headquartered in Athens, GA)
	SE For. Exp. Sta.	C. W. Fatzinger I. L. Williams	***Development and evaluation of a trapping system, using host-produced behavioral chemicals, for preventing attacks by the black turpentine beetle, *Dendroctonus terebrans* (Oliv.), and engraver beetles, *Ips* spp., in naval stores areas.
Georgia	Univ. of Georgia	C. W. Berisford L. H. Kudon	**Impact of hymenopterous parasites on populations of southern pine and *Ips* spp. beetles: Validation of a conceptual model of parasite host interactions.
	Univ. of Georgia	C. W. Berisford R. F. Mizell III L. H. Kudon	**Colonization and brood production of southern bark beetles in slash residue: 1) Population estimates of attack/emergence, 2) the effect of slash size and age.
	SE For. Exp. Sta. Univ. of Florida Union Camp Corp.	R. P. Belanger T. Miller R. S. Webb J. F. Godbee	Forest management strategies for reducing beetle- and pathogen-caused losses in planted stands: the salvage cutting of trees infected with fusiform rust.
	SE For. Exp. Sta.	C. W. Fatzinger I. L. Williams	***Development and evaluation of a trapping system using host-produced behavioral chemicals for preventing attacks by the black turpentine beetle, *Dendroctonus terebrans* (Oliv.), and engraver beetles, *Ips* spp., in naval stores areas. (Project headquartered in Olustee, FL)
	SE For. Exp. Sta. Univ. of Georgia	G. A. Koenigshof J. R. Beckwith J. T. Rice	***Determining technical properties and economic feasibility of COM-PLY panels made with flakeboard cores containing beetle-killed southern pine wood, Phase III.
	Univ. of Georgia	C. W. Berisford L. H. Kudon	Development and evaluation of a behavioral chemical for southern pine beetle suppression. (attractant tactic)
Louisiana	Region 8, S&PF Holly Springs NF Region 8, S&PF	M. D. Connor D. A. Starkey J. Fort R. J. Uhler W. N. Nettleton	Integrated pest management on National Forests: Demonstration project on the Holly Springs District of Mississippi.
	Region 8, S&PF	W. N. Nettleton M. D. Connor	Application of southern pine beetle spot growth models in the Gulf Coastal Plain.
	South. For. Exp. Sta.	W. C. Anderson R. W. Guldin	Assessment of investment risk for forest stands infested by bark beetles.

Location	Performing Organization	Principal Investigator(s)	Title of Project
	South. For. Exp. Sta.	J. R. Bridges	Characterization of fungi associated with the southern pine beetle and their relationship to beetle population dynamics.
	South. For. Exp. Sta.	P. L. Lorio, Jr. R. A. Sommers	Stand structure and its relationship to southern pine beetle spot growth.
	South. For. Exp. Sta.	W. L. Nance T. R. Dell R. C. Froelich E. Shoulders	A yield prediction system for unthinned slash and loblolly pine plantations infected with fusiform rust. (Project headquartered in Gulfport, MS)
	Miss. State Univ.	T. E. Nebeker J. D. Hodges	Influence of thinning operations on southern pine susceptibility to pine bark beetles in Mississippi and Alabama. (Project headquartered in Mississippi State, MS)
	Univ. of Arkansas—Fayetteville	F. M. Stephen T. D. Paine	Evaluation of host tree resistance and its effect on southern pine beetle population dynamics. (Project headquartered in Fayetteville, AR)
Maryland	Univ. of Maryland Frostburg State College	W. A. Thompson	ITEMS—a computer system for projecting economic returns on southern pines from bark beetle hazard reduction and spot treatment.
Mississippi	South. For. Exp. Sta.	J. R. Bridges	Characterization of fungi associated with the southern pine beetle and their relationship to beetle population dynamics. (Project headquartered in Pineville, LA)
	Region 8, S&PF Holly Springs NF Region 8, S&PF	M. D. Connor D. A. Starkey J. Fort R. J. Uhler W. N. Nettleton	Integrated pest management on National Forests: Demonstration project on the Holly Springs District in Mississippi. (Project headquartered in Pineville, LA)
	Region 8, S&PF	W. N. Nettleton M. D. Connor	Application of southern pine beetle spot growth models in the Gulf Coastal Plain. (Project headquartered in Pineville, LA)
	Miss. State Univ.	J. D. Hodges T. E. Nebeker	**Intensive examination of soil physical properties following thinning operations under wet and dry soil moisture conditions.
	Miss. State Univ.	T. E. Nebeker J. D. Hodges	Influence of thinning operations on southern pine susceptibility to pine bark beetles in Mississippi and Alabama.
	Univ. of Arkansas—Fayetteville	F. M. Stephen T. D. Paine	Evaluation of host tree resistance and its effect on southern pine beetle population dynamics. (Project headquartered in Fayetteville, AR)
	South. For. Exp. Sta.	W. L. Nance T. R. Dell R. C. Froelich E. Shoulders	A yield prediction system for unthinned slash and loblolly pine plantations infected with fusiform rust.
New Mexico	Univ. of New Mexico Univ. of Arkansas—Fayetteville	R. G. Gates F. M. Stephen	Induced chemistry of loblolly pine with regard to phenology, host resistance, and suitability to the SPB-fungal complex.
North Carolina	NC State Univ.	F. P. Hain W. D. Mawby	Predicting areawide southern pine beetle population levels based upon historical records, host patchiness, weather factors, and interspecies competition.
	Region 8, S&PF	W. H. Hoffard S. W. Oak	Integrated pest management on National Forests: Demonstration project on the Sumter National Forest in South Carolina.
	SE For. Exp. Sta.	J. C. Nord A. S. Jones F. L. Hastings	Evaluation of selected insecticides for control of the black turpentine beetle and evaluation of repellents for prevention of attacks by *Dendroctonus* and *Ips* beetles in southern pines.
South Carolina	Clemson Univ.	D. L. Ham R. L. Hedden F. H. Tainter	Integrated forest pest management in South Carolina: Phase II (in collaboration with SC For. Comm. and Region 8, S&PF)
	SE For. Exp. Sta. Univ. of Florida Union Camp Corp.	R. P. Belanger T. Miller R. S. Webb J. F. Godbee	Forest management strategies for reducing beetle- and pathogen-caused losses in planted stands: the salvage cutting of trees infected with fusiform rust. (Project headquartered in Athens, GA)

Location	Performing Organization	Principal Investigator(s)	Title of Project
	Region 8, S&PF	W. H. Hoffard S. W. Oak	Integrated pest management on National Forests: Demonstration project on the Sumter National Forest in South Carolina. (Project headquartered in Asheville, NC) (In collaboration with SC For. Comm. and Region 8, S&PF)
	SC For. Comm.	M. C. Remion	Integrated forest pest management in South Carolina: Phase II (in collaboration with Clemson Univ. and Region 8, S&PF)
Texas	Region 8, S&PF	W. N. Nettleton M. D. Connor	Application of southern pine beetle spot growth models in the Gulf Coastal Plain. (Project headquartered in Pineville, LA)
	Texas A&M Univ. Texas Forest Service	R. N. Coulson T. L. Payne L. Hu E. Rykiel P. E. Pulley R. F. Billings	Decision-support system development for southern pine beetle management.
	Texas A&M Univ.	R. N. Coulson P. E. Pulley T. L. Wagner	Statistical modeling of pest population dynamics (TAMBEETLE) for use in southern pine bark beetle management decisionmaking and development of quantitative estimation procedures.
	Texas A&M Univ.	R. M. Feldman P. J. H. Sharpe H. Wu	Biophysical modeling of pest population dynamics for use in southern pine bark beetle management decisionmaking.
	Texas A&M Univ.	T. L. Payne	Development and evaluation of a behavioral chemical for southern pine beetle suppression. (attractant tactic)
	Texas Forest Service	R. F. Billings C. M. Bryant V C. Walker	***Toward the integrated management of southern pine beetle in east Texas—Phase V of the Polk and Tyler County demonstration area.
Virginia	Virginia Polytech. Instit. & State Univ.	S. A. Alexander	***An annosum root rot prediction model for rating the susceptibility of loblolly pine to infestation by the southern pine beetle.
	Virginia Polytech. Instit. & State Univ.	R. H. Hokans S. A. Alexander	***Growth impact models for annosus root rot in thinned loblolly pine stands.
	Univ. of Virginia	P. J. Michaels	**Improved specification of the climatic component of southern pine beetle host susceptibility with multivariate statistical methods.
	Univ. of Virginia	P. J. Michaels	***Estimating the future areal coverage of southern pine beetle infestation over large areas: an integrated approach.

[1]Projects with field work in more than one State are listed in each of the States in which work is performed.
**Funded in FY 82.
***Funded in FY 83.

Cooperator Publication Honored

The American Society of Photogrammetry recently announced that Charles W. Dull and William H. Clerke have been named winners of a second prize in the Society's 1983 President's Awards for Practical Papers, for their paper, "Loran-C Navigation as an Aid to Aerial Photographic Operations," which appeared in the November 1983 issue of Photogrammetric Engineering and Remote Sensing and was cited in a recent issue of PM News. The presentation was made at the ASP Convention in Washington, D.C., on March 14. The application of Loran-C for use by Region 8 and cooperators was funded in part by the Expanded Southern Pine Beetle Program.

Dull is an entomologist and Clerke a remote sensing specialist with the Southern Region, Forest Pest Management in Atlanta.

S.C. Demo Project Updates Progress

Forestry Extension, SC Forestry Commission, and Forest Service investigators in the SC Demonstration Project have been very busy judging by recent reports issued from their projects. The S.C. Forestry Commission has established procedures and guidelines for use of a portable sawmill for salvaging beetle-killed timber, or for thinning to reduce the risk of infestation. Results of their activities will be presented in a newsletter in the near future. Meanwhile, entomologists from the Southern Region (Asheville office) are completing hazard rating of pine stands for SPB and littleleaf disease on the Enoree and Tyger Ranger Districts, Sumter National Forest. The benefits from this work will be described soon. At the same time, the Clemson group is evaluating, developing, and disseminating informational and educational

materials. A brief capsulization of recent activities of the Pest Management Information Center at Clemson is reprinted below from the demonstration project's latest newsletter.

PEST MANAGEMENT INFORMATION CENTER

The major effort in Clemson during the past four months has been directed at preparing and obtaining informational material that will be available through the Pest Management Information Center. By formally naming the primary point of distribution of our integrated pest management information, we hope to focus attention on our efforts to provide the latest IPM material to landowners, foresters and pest managers. Pest leaflets and other publications as well as video materials, computerized pest status reports, and decision-making software are, or soon will be, available through the Pest Management Information Center. Leaflets published by the IPM project thus far include:

- IDENTIFYING THE SOUTHERN PINE BEETLE, Forestry Leaflet No. 5
- SALVAGE REMOVAL, A Method for Controlling Southern Pine Beetle Infestations, Forestry Leaflet No. 6
- CUT-AND-LEAVE, A Method for Controlling Southern Pine Beetle Infestations, Forestry Leaflet No. 7
- ESTIMATING POTENTIAL LOSS FROM THE SOUTHERN PINE BEETLE, Forestry Leaflet No. 8
- PORTABLE SAWMILL OPERATORS IN SOUTH CAROLINA, Forestry Leaflet No. 9
- SO, YOU WANT TO BUY A PORTABLE SAWMILL?, Forestry Leaflet No. 10
- PREDICTING POTENTIAL LOSS To the Southern Pine Beetle in Natural Stands in the Piedmont, Forestry Leaflet No. 11

Copies of all the publications listed above are available through the Extension Forestry Pest Management Information Center or local County Extension or Forestry Commission offices.

COMPUTER SYSTEM

Since November, Mike Marshall and Chet Karpinski have devoted a great deal of time and effort in developing software for a Radio Shack Model 16B microcomputer that will be a vital part of our Pest Management Information Center. The development is progressing extremely well and access to the system should be available no later than July, 1984. It will be accessible by telephone hookup through the County Extension computer system or other compatible terminals. Up-to-date pest status information and IPM decision-making software will be available free of charge.

OTHER ACTIVITIES

Besides his many other activities and contributions, Frank Tainter is in the final stages of producing two 16 mm films, one on littleleaf disease and one on the use of the portable sawmill as a pest management tool. They will be available later this year. Although we are continuing to develop publications, video materials and the computer system, we are also presenting and demonstrating IPM information to landowners and professional foresters.

Ellis Named Station Director

Dr. Thomas H. Ellis has been appointed Director of the Southern Forest Experiment Station, effective March 5, 1984. He succeeds Larry Lassen, who recently became Director of the Forest Service's Intermountain Station in Ogden, Utah.

Tom's name is a familiar one to us in the IPM Program, as he has served as a member of our Oversight and Guidance Committee since the Program was established in FY 1981.

Dr. Ellis served as Assistant Director of the Southeastern Forest Experiment Station at Gainesville, Florida, prior to assuming his new post. As Southern Station Director, he will administer research programs throughout the South and Puerto Rico. A native of the region, Dr. Ellis received his BS in Forestry at the University of the South in Sewanee, Tennessee, his MS in Forestry at Yale, and his Doctorate in Forest Economics at Michigan State. He started his FS career with the Southeastern Station in 1958.

Where Are We in Integrated Pest Management?

Scientists and practitioners gathered at the Valley River Inn in Eugene, Oregon, on March 5 – 8, 1984, to address this question after 10 years of accelerated work in integrated pest management. The occasion was the 35th Annual Western Forest Insect Work Conference, and nearly 170 entomologists, pathologists, and foresters chiefly from the western United States and Canada were there to assess what has been accomplished thus far in this field and what still needs to be done. Problems discussed included pests such as the western budworm, the gypsy moth, the mountain pine beetle, regeneration pests, and the tactics and strategies that have been developed to deal with these and other pest problems, environmental concerns, and success in marketing and implementing pest management technology.

Some programs, notably those concerned with the mountain pine beetle and southern pine beetle, have accomplished much in developing and implementing pest management approaches. Work on other major pests (the Douglas-fir tussock moth, the spruce budworm, the western pine beetle are examples) has advanced to the stage where preventive or remedial control systems are available and need to be used in operational programs. In some cases, field testing or model validation still remains to be done, control approaches need to be tested, or impact assessment and predictive systems must be evaluated under a

broader range of management conditions. And, as always, there are problems in achieving an adequate understanding of the low level population behavior, learning how to more effectively define and manage susceptible forests, getting a better handle on pest-host-environment interactions, and advancing beyond the traditional approach of dealing with pests only when they are at epidemic levels.

Considerable knowledge is already in hand. It now remains to be evaluated under semi-operational conditions and/or packaged and incorporated into management prescriptions, plans, and operational programs. The future seems bright if what is already available is effectively used and, where necessary, serves as a base for further developmental and applied studies.

Success Story Has IPM Implications

Just as in the South, losses to bark beetles can be minimized elsewhere by good forest management. This is well illustrated by an IPM plan in the West that has received national attention. Tree diversity is the cornerstone of a forest improvement program called "Greenslope" undertaken in 1979 to protect a 7,000-acre forest on the west side of Boulder, Colorado. Diversity of stands is an asset to a forest because it reduces chances of a disastrous fire or insect and disease outbreak, and thus aids in long term forest protection. Experience shows that dense, uniform forests foster deadly beetle attacks and, conversely, differing tree ages, differing species, and differing stand densities are a natural deterrent to pest outbreaks.

Writing about "Greenslope" in *American Forests*, a Boulder District Forester described the management plan that started out as a short term battle against a pine beetle crisis and evolved into a long-term comprehensive management plan that exhibits the principles of integrated pest management at their best. The writer points out that trees "on the biological edge"—those undergoing physiological change as a result of aging—create a hazard for the rest of the forest because of increased susceptibility to insects and disease and that selective harvesting reduces the chances of an outbreak. The article describes how silvicultural practices such as thinning create diversity, improve wildlife habitat, and purposely disturb soil to initiate new plant growth.

The Greenslope Plan, addressing some ideological conflicts between preservation and management, involves harvesting trees periodically on a maintenance basis to prevent conditions that would again support a pine beetle epidemic. To "manage," the writer emphasizes, requires planning, budgeting, hard work, and public involvement in management decisions, and future conditions depend on what is done now. (See Gosnell, Ron. Greenslope. Amer. Forests 90(1):47 – 55; 1984 January).

Loblolly Pine Symposium Proves Successful

More than 350 foresters, landowners, educators, and researchers met in Jackson, Mississippi, on March 20 – 22, 1984 to discuss current technology on the loblolly pine ecosystem in the mid-South. Dean Warren Thompson, School of Forest Resources, Mississippi State University, welcomed the attendees and discussed the importance of loblolly pines to southern forestry and in meeting present and future needs for softwood products. He also noted that this pine is probably the most studied species in the world, yet much remains to be learned before it can be most effectively managed.

Zeb White (Consultant), Bob Zahner (Clemson University), Bill Harms (Southeastern Forest Experiment Station), and Bill McWilliams (Southern Forest Experiment Station) set the stage for the meeting by describing the development and expansion of loblolly pine stands in the South, shifts from virgin to second growth stands, the emergence of the Third Forest, soils and climatological conditions associated with physiographic provinces, silvical characteristics of the species, and distribution, ownership, stand origin, and growth and regeneration patterns in the mid-South.

Keville Larson (Consultant), Steve Hames (Weyerhaeuser Company), Doug Crutchfield (Westvaco), Ed Barron (Texas Forest Service), and Jim Barnett (Southern Forest Experiment Station) discussed stand establishment. Topics included regeneration methods for natural and artificially regenerated stands, use of genetically improved stock and known seed sources, purposes and methods for site preparation, methods or options for establishing stands using direct seeding, planting of improved stock, or containerized seedlings.

Two sessions were devoted to stand tending. Bob Farrar (Southern Forest Experiment Station), Joe Hughes (Weyerhaeuser Company), Dean Gjerstad (Auburn University), and Al Sullivan (Mississippi State University) discussed density regulation in natural and planted stands, means for controlling undesirable vegetation, and methods for determining the growth and yield of loblolly pine in plantations and natural stands. George Switzer (Mississippi State University), Gerry Hertel (Southern Forest Experiment Station), Carlton Owen (Potlatch Corporation), and Don and Bob Tufts (International Paper Company and Auburn University, respectively) described means for maintaining and increasing prod-

uctivity, identification and control of insects and diseases affecting stand age classes, integration of wildlife and stand management practices, and various harvesting and utilization techniques.

The final session was concerned with some of the many factors that managers and landowners must consider in management activities. Bob Karr (Mississippi State University), Dick Kennedy (Georgia-Pacific), George Dutrow (Southeastern Forest Experiment Station), Art Nelson (Consultant), Tom Terry (Weyerhaeuser Company), and Dr. Robert Schultz (Southern Forest Experiment Station) reviewed landowner attitudes, management goals and practices, needs for increased attention to improved forest practices, particularly on nonindustrial private ownerships, economic factors affecting management decisions, the development of and response by management to environmental concerns, and some thoughts on the future of loblolly pine stands in the South.

The proceedings will be published in the near future. The meeting was sponsored by the School of Forest Resources, Mississippi State University, Mississippi Cooperative Extension Service, and Southern Forest Experiment Station.

Fact Sheet Revised

SPB Fact Sheet No. 17 has been revised recently. This bulletin, originally issued in January 1981, deals with chemical control. The new update presents information on both preventive and remedial controls. It also provides a diagram which illustrates effective and ineffective ways to protect standing trees with insecticidal sprays. Copies may be obtained from the Southern Region, USDA Forest Service, 1720 Peachtree Road NW, Atlanta, GA 30367.

SPB Slide Tapes Available

Ginger Rutherford recently announced that a series of slide tapes on the southern pine beetle is now available from SOUTHFORNET. These include: 1) Control Methods for the SPB; 2) The Biology and Identification of the SPB; 3) Insects Associated with the SPB; 4) Building Among the Pines (protecting trees from beetle damage during construction); 5) Silviculture Can Reduce SPB Losses; and 6) Chemical Control of SPB. For further details and ordering information, contact SOUTHFORNET, Science Library, University of Georgia, Athens, GA 30602, or call Ginger at 404-546-2473 or (FTS) 250-2477.

Other Publications

Anonymous. Reducing southern tree disease losses. The American Tree Farmer 2(6); 1983. p. 16.

Branham, Susan J. Beetlemania: trouble for the building trade. Forests and People 34(1); 1984. p. 16 – 17.

Hedden, R. L.; Karpinski, C. Estimating potential loss from the southern pine beetle. For. Leafl. No. 8. Clemson, SC: Clemson University and the South Carolina Forestry Commission. 1983 September. 4 p.

Hertel, G. D.; Mason, G. N. Manage to reduce SPB. The Amer. Tree Farmer 2(6); 1983. p. 15.

Karpinski, C.; Ham, D. L.; Hedden, R. L. Predicting potential loss to southern pine beetle in natural stands in the Piedmont. For. Leafl. No. 11. Clemson, SC: Clemson University and the South Carolina Forestry Commission, 1984 January. 6 p.

South Carolina Forestry Commission. Convert your beetle-killed pines to lumber. (Unnumbered Fact Sheet describing portable sawmill lease arrangements and public demonstrations.) Columbia, S.C. South Carolina For. Comm. 1984. 2 p.

Tainter, Frank H.; Ham, D. L. Portable sawmill operators in South Carolina. For. Leafl. No. 9. Clemson, SC: Clemson University and the South Carolina Forestry Commission. 1983 October. 4 p.

Tainter, Frank H.; Ham, D. L. So . . . you want to buy a portable sawmill. For. Leafl. No. 10. Clemson, SC: Clemson University and the South Carolina Forestry Commission. 1983 December. 8 p.

Tainter, Frank H.; Ham, D. L. Don't leave your trees to rot . . . utilize them! For. Leafl. No. 12. Clemson, SC: Clemson University and the South Carolina Forestry Commission. 1984 February. 6 p.

Wagner, Terence L.; Gagne, James A.; Sharpe, Peter J. H.; Coulson, Robert N. A biophysical model of southern pine beetle, *Dendroctonus frontalis* Zimmermann (Coleoptera: Scolytidae), development. *In:* Ecological Modeling 21:125 – 147. Amsterdam, The Netherlands: Elsevier Science Publishers B.V.; 1983/1984.

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